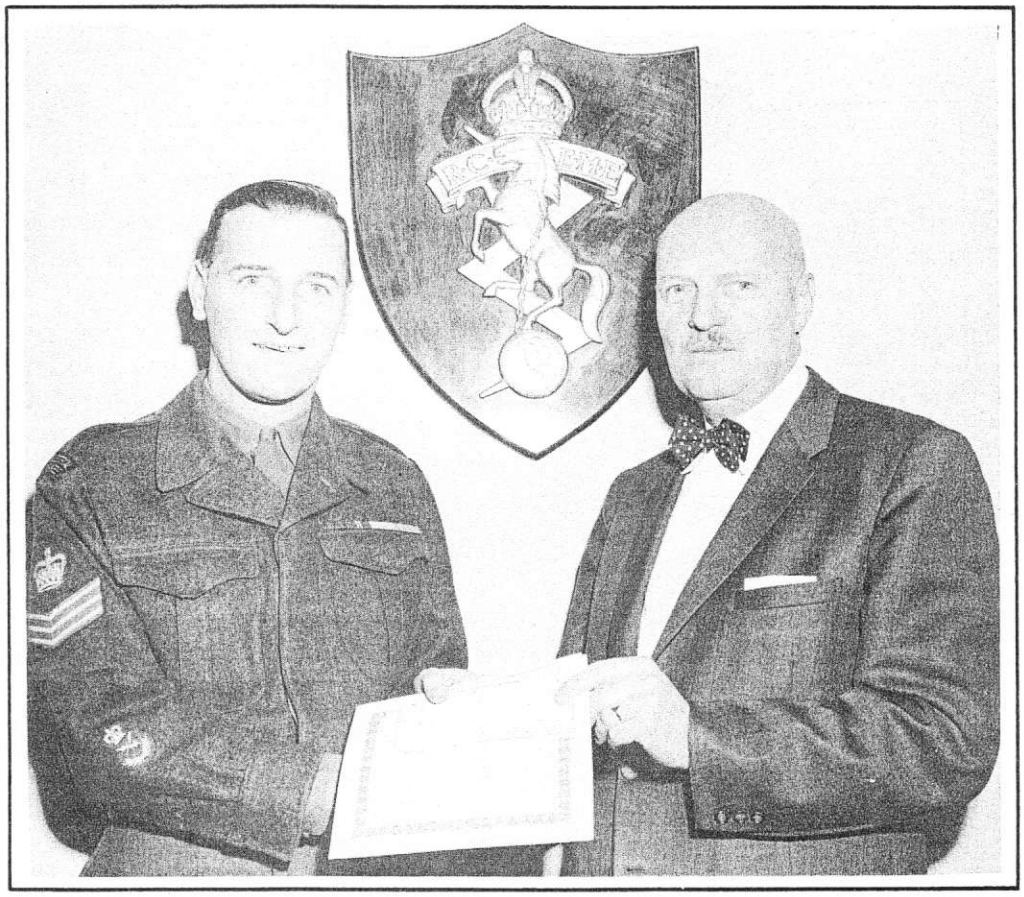
# RCEME TECHNICAL BULLETIN



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RESTRICTED

DIRECTORATE OF ELECTRICAL AND MECHANICAL ENGINEERING

# RCEME
# TECHNICAL BULLETIN

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COVER: The Director presenting a Suggestion Award cheque and certificate to S sgt JM Ronan; see also page 25

## NO 1. PRODUCTION AND WELFARE

By Capt AS Etter, 56 Inf Wksp, UNEF

Wouldn't it be nice to have some 13,000 line items in the Spare Parts Stores Section to support a fleet of 870 vehicles? We have! The thorn on the cactus, though, is the fact that the fleet of 870 vehicles represents no fewer than 121 makes/models/types/countries of origin. Therein lies the problem of keeping the United Nations Emergency Force rolling on wheels.

Most second line workshops, in our corps history, have been supplied with base facility back-up in some form. Here in the Sinai the base repair facility is either local contract, or plants in Europe and the United States. Local contract repair of major vehicle assemblies is undertaken in Gaza, Ismailia, Cairo and Beirut for items which can be repaired and rebuilt in the Middle East. Some assemblies, such as the transmission assembly for truck 2 1/2 ton 6x6 GMC, are shipped all the way back to the USA for rebuild. As a result of this situation our workshop in Egypt becomes involved in a considerable quantity of what is technically base repairs, overhaul and rebuilding.

The scope of repair experience provided to RCEME tradesmen is of considerable interest. The individual challenge presented by the ever changing jobs, on a multitude of equipments, is a stimulating change from our normal stereotyped peace time employment in Canadian shops. We see and repair a wide range of types and makes of vehicles; operating conditions are rugged; maintenance standards differ between contingents; the accident rate is high; critical spare parts are often in short supply and repair expedients and improvization give ample scope to individual initiative and ingenuity. Vehicle mechanics working in support of the UNEF have an opportunity to get acquainted with a much wider range of vehicles and equipments than comparable employment elsewhere would normally provide.

As it operates at present, 56 Cdn Inf Wksp RCEME provides the normal second line support for the Force of approximately brigade strength. The shop sections include light and heavy vehicle; tire; body, welding and radiator; textile; carpenter; component; tels; small arms; instrument; battery; the normal R&I section and the normal control office. There are many exceptions to normal operating practice in the operation of the workshop. It must be appreciated that the workshop is a United Nations Emergency Force unit and while its operation is not generally contrary to normal Canadian practice it could hardly be said to function in accordance with the 'book' as we know it.

The manufacturing work load is not heavy, mainly due to the limited facility and equipment rather than any limited requirement. The shop repair and rebuilding load includes transmissions, engines, transfer cases, axle assemblies, generators, starting motors, pumps and small engine-powered equipments, brake relining, brake cylinder rebuilding, clutch refacing and relining, wheel drum refinishing and

rebuilding of all the minor assemblies associated with vehicles. This load keeps the components section of the shop going full throttle all the time. Despite the fact that much of the assembly repair load goes out to local contract there is still an impressive volume and a considerable variety produced by the workshop itself.

The vehicle equipments serviced range from Citroen cars to 5 and 10 ton trucks. Light vehicles include the 'jeep' class of various makes and models, cars, station wagons and light cargo vehicles in the 3/4 and 1 ton class. The cargo vehicle fleet includes the 2 1/2 and 3 ton vehicles - GMC, REO, Bedford, Ford, and Alfa Romeo, and the 5 and 10 ton class. Heavy vehicles include the Force engineering equipment (road graders, crawler tractors, cranes, truck tractors and floats), buses and some items used by the Air Force component of the force.

Variety is also the spice of life in other sections. The tels shop work on record players, juke boxes, commercial radios, tape recorders, and quantities of motion picture projectors, in addition to a miscellaneous collection of radio receivers and transmitters. Many of the national contingents brought welfare stores and amenity equipment from their home countries; a list of makes, models and countries of origin of electronic equipments reads like the inventory of an international second-hand store.

The electrical section struggle with a load of generators and lighting plants which would lower the voltage of the keenest electrician. The force has literally hundreds of generators and lighting plants with hardly any two alike. The section also has a heavy volume of starting motors, vehicle generators, distribution panels, lamps, stoves, fans and assorted electrical appliances the variety of which is amazing and the electrical characteristics of which your scribe finds slightly confusing. Seems like the whole world doesn't use 110-220-550 volts at 60 cycles, and our present staff are convinced that there is an easier way than connecting up an appliance to the first available power source to determine its electrical requirements. This has something to do with running 110 volt equipment on 220 volt lines which is not quite clear yet.

The weapons section (small arms only since there is no Arty with the force) might be thought to coast a bit with only rifles, pistols, machine carbines and a few machine guns to service and repair. Not so. With a diabolical running (some time in the past) these stalwarts were also made responsible for stove and lamp repairs. Stoves by the hundreds, stoves by the thousands, lamps, lanterns, pumps, heaters, odd-ball equipments such as filing cabinets, locks, safes, weigh scales, and everything else which doesn't fit neatly in some other section - even the classic B-flat bugle and the bicycle in addition to the recreational shotguns and the rifles for match target riflemen - it all ends up in the small arms shop, where the only complaint is "TRADES PAY"?

The body shop are busily welding, brazing and soldering, denting, bumping and patching - vehicles, trailers, special bodies for

vehicles, water tanks, specialist vehicles, radiators, operating room tables, spits for roasting goats (who said there was little manufacturing in this unit?), frames, stands, and fixtures. You name it, they make it or fix it.

The instrument section lead a quiet, complacent and quite smug existence. It seems that, due to the 'exigencies of the service', they are the proud possessors of the only air-conditioned room in captivity -- a REAL air conditioner -- one that lowers the inside temperature by at least a cool ten degrees. This is supposedly connected in some mysterious way with the deleterious effects of human perspiration in the works of watches and in the innards of binoculars; anyway they won this gadget some time ago and it is the envy of the shop. Their workload includes everything in the instrument line from commercial watches to vehicle and aircraft instruments, typewriters of all makes and models, office equipment most of us never heard of before, and a collection of optical instruments which would be welcomed by any war museum.

There is a quartermaster stores section appended loosely to the administrative headquarters of the workshop. Therein mysterious things are done to and with check lists, receipt vouchers, the loads of shop vehicles, the contents of tool boxes, and the array of cans and boxes which seem to be part of life in the desert. The problems of new excuses for new shortages (of stationery, of expendable stores, of tools, of string for parcels, of fittings, of many things one finds listed in standard hardware catalogues, and in the Canadian Tire Company catalogue and even (sometimes) in the Ordnance catalogue) is ever with them. Between too much ammunition and not enough brass, too many tent stoves and not enough heaters, too much paper and not enough tools, they find time to worry about little things such as, "Who owns the shop van vehicle, anyway?" and "Who had the unmitigated gall to EAT the emergency ration pack, it was on charge to the unit?" and "Why does it take gasoline to operate the ice making plant, any fool knows ice is only frozen water?"

The workshop operates some unconventional items and services; sometimes in unconventional ways, too. A motion picture theatre runs every night back in the dark somewhere. An ice-making machine turns out frozen water. The workshop runs a chess school. The unit makes an effort to up-grade eligible tradesmen (from other units as well) and operates a pool for RCEME replacements with other units. The shop runs operator's courses for personnel of other contingents and despatches resident inspectors to Cairo and Ismailia to supervise local contract work. The workshop manges to produce almost anything, from a piano tuner to a lock-smith, and from a darts team to a team for serious drinking.

The welfare services include sports equipment and organized tours to points of interest in the Middle East. It is possible to visit Cyprus or the ruins of Petra, St Catherine's Monastery or the Holy Cities of Jerusalem and Bethlehem; leave centre hotels for UNEF personnel operate in Beirut in the summer and Cairo in the winter.

Inter-contingent sports' meets take place periodically and include such diverse activities as contract bridge and pistol shooting, soccer and chess, rifle shooting and baseball, horse shoes and polar bear winter swim meets.

Life for the tradesman is interesting and often challenging. Work is varied and seldom repetitive, even in the component section where rebuild might be expected to become boring. There are enough parades and regimental activities to break the monotony but not so many as to duplicate life at a Corps school. There is enough leisure time to enjoy sports, swimming and sight-seeing but still enough work to do to balance life. Beer is inexpensive and plentiful; there are lots of (pin-up) girls, there is some extra pay, there is plenty of sunshine, there is even a 9-hole golf course which boasts of the finest sandtraps in the world. A man has lots of companions in the same strip of desert sand and he has much in common with all of them - regardless of their nationality. There is an amply-stocked canteen where souvenirs and some duty-free items can be purchased. What more could a tradesman want?

In spite of all the trials and tribulations associated with service in the Middle East, the year is a rewarding experience not only for the technical skills acquired but also for the firm friendships made with men from all the national contingents.

## ENGINEERING TECHNICIANS SERVE UNEF

The United Nations Emergency Force in the Middle East is yet one more place where Engineering Technicians are doing an important job. Lt EM Conway, Engineering Technician, is an officer in 56 Canadian Infantry Workshop of the Royal Canadian Electrical and Mechanical Engineers serving as part of Canada's contribution to the United Nations in the proverbial desert sands of Egypt.

Setting up repair facilities for military equipment in an area where blowing sand is commonplace is a source of constant challenge to these military engineers and engineering technicians. Imagine trying to rebuild an engine assembly with sand blowing into cylinders and bearing surfaces, adhering to lubricants and binding threads.

Flexibility is the by-word in this Workshop which is faced with a work load of at least 50 different types of vehicles and two or three models of each type being operated by Brazilian, Indian, Swedish, Danish, Norwegian, Yugoslav and Canadian troops. Some of these include Austins, commercial jeeps, military pattern jeeps, Bedfords and standard commercial vehicles of many types and models.

Located at Camp Rafah in the Sinai Peninsula just outside the Gaza Strip, the workshop personnel are responsible for all recovery operations throughout the area, in addition to seeing that the many and varied types of weapons and wireless sets are kept in first class working order.

## DEMAND FOR ENGINEERING TECHNOLOGISTS AND TECHNICIANS INCREASES

by WO1 JW Hayes

For sometime now it has become apparent that there is a growing shortage of trained technical personnel in Canada and undoubtedly this shortage will become more acute in the future.

Concern has been expressed from time to time by leaders in industry over the shortage of engineers, but this shortage has stemmed from the fact that a large proportion of Canadian engineers are doing the technician's work and haven't the time to be doing actual engineering.

The obvious solution to this problem was to encourage more young men to further their training in the skills and theory of engineering.

The Ontario Department of Education set up an experimental high school institute in Toronto in 1948, the Ryerson Institute of Technology. That year the school admitted 200 students. This year 1974 students enrolled in a total of 19 three-year courses and 2 specialties of two-years duration. The courses this year include aeronautical, architectural, chemical, civil, electrical, gas, instrument, mechanical, medical and metallurgical technology.

The need for such institutes led the Department of Education officials recently to open three new institutes, in Ottawa, Hamilton and Windsor.

Ontario was not the first province to realize the need of technological schools. Alberta could boast of the Provincial Institute of Technology and Art in Calgary which now offers 21 technology courses with an enrolment of 1300.

The New Brunswick Technical Institute in Moncton was established in 1947 and a recent survey showed that approximately 90% of the 3900 graduates since 1947 were employed in that Provinces' own industries.

It is interesting to note that the Province of Quebec has the most extensive program of technological education with no less than ten institutes spread across the province.

The latest entry in the provincial program of technological education is the Province of Saskatchewan which has been operating on a limited scale for the past two years although it will be another four years before their institute will be operating at full capacity.

The growing importance of the need for recognition of trained technicians and technologists has not gone unnoticed by the engineering profession. Until 1957 technologists were leaving their schools armed only with their diplomas. They had no professional status. That year the Association of Professional Engineers of Ontario announced a plan of certifying and recognizing their academic qualification and practical experience.

The Technologist Certification Program, as this program is called, provides for three grades of technicians, and a senior grade of Engineering Technologist. Qualification for Grade 1 Technician requires the completion of grade 12, provided the applicant has completed the science and mathematical subjects and has two years practical experience.

Qualification for Grade 2 Technician requires the completion of grade 13 and at least two years of practical experience under the guidance of a professional engineer.

To qualify for Grade 3 Technician requires the successful completion of one year of an engineering course at a recognized university or two years at an institute of technology or a Higher National Certificate from Great Britain.

To qualify as an Engineering Technologist a person must have completed two years of engineering at a recognized university or a three-year course at an Ontario institute of technology coupled with one year of practical experience.

Successful applicants are awarded a diploma from the Association of Professional Engineers of Ontario.

It is interesting to note that the National Society of Professional Engineers in the United States announced in June of this year, the organization of an Institute for the Certification of Engineering Technicians.

Engineering Technicians and Technologists will no doubt benefit from the growth of a parallel program in the United States.

The following officers and men of the Corps of RCEME have been certified by the Association of Certified Engineering Technicians and Technologists of Ontario.

Capt JS McIntyre
Capt JR O'Neill
Lt EM Conway
Lt TM Mimee
WO1 CA Churchill
WO1 RF Conway
WO1 SB Cozens
WO1 JW Hayes
WO1 JD Snell
WO1 AJ Venus
WO2 JC Coles
WO2 FL Rodd
WO2 JV Sambrook
S sgt CG Ashdown
S sgt JM Blanchard
S sgt RC Cross
S sgt RW Manning

## LOOKING AHEAD WITH CANADA

The following article is reprinted with the kind permission of the Association of Professional Engineers of the Province of Ontario.

The Corps of RCEME supports the Engineering Technician and Engineering Technologist program and urges all artificers and classified officers to become certified.

Interested personnel may obtain application forms by writing to:

The Association of Professional
Engineers of the Province of Ontario
236 Avenue Road
Toronto 5, Ontario.

### INTRODUCTION

We witness today continued advances in industrial mechanization, increased attention to man-machine systems and a greater use of mechanical muscles guided by electronic brains. Backing up the scientists and engineers who do the research and who apply its findings is an indispensable group of technicians who participate in development work and help produce and maintain the complex equipment and its product.

Technicians who work with engineers and scientists are amongst the fastest growing occupational groups. Our expanding economy has intensified the demand for technical workers who could take over the jobs requiring a combination of basic scientific and mathematical knowledge and manual skill, thus freeing engineers for the more creative and supervisory tasks for which their training especially fits them.

In general the work of an Engineering Technicial falls between that of a skilled craftsman and the professional engineer. The work is technical in nature but narrower in scope than that of an engineer and has a practical rather than a theoretical orientation. The nature of the work performed by technicians varies tremendously among industries and among plants in the same industry.

Engineering Technicians who are well trained can usually move within a wide range of related jobs. Many have skills which can be transferred from one industry to another or from one job to another within the same industry.

### RELATIONSHIP WITH THE ENGINEERING PROFESSION

It has been evident for some time that the so-called "shortage" of engineers was created in some measure by the shortage of Engineering Technicians. Industry, faced with a scarcity of technicians, frequently employed professional engineers where engineering technicians could have performed adequately and well.

It is understandable, therefore, that the Engineering Profession would take an interest in encouraging engineering technicians to improve their academic training and in providing a means for engineering technicians to achieve recognition of their talents, their ability and their potential value to industry. To maintain a high standard of efficient operation most professional engineers need the support of well-trained engineering technicians.

In June 1956 the Association of Professional Engineers of the Province of Ontario announced a program of certifying or recognizing the academic and experience qualifications of Engineering Technicians. This was the first step taken to provide official recognition of the group that has been active in industry for many years but for whom there has been no standard of education and no standard of public recognition.

Under the Association's Certification Program provision is made for three grades of Engineering Technician and a senior grade to which the title Engineering Technologist has been given. The grading system has been based upon progressive academic qualifications combined with experience under engineering supervision. The academic and experience requirements for each grade are outlined on the application form.

## THE VALUE OF CERTIFICATION

For the first time progressive steps have been taken to provide recognition for those who assist professional engineers in carrying out their professional duties. For the first time guidance has been offered to those individuals who were hungry for knowledge but who had no precise path to follow in improving their academic training.

As more individuals receive their certificates and as the knowledge of the program becomes more widespread, public recognition of the talents of certified Engineering Technicians will provide ample reward to those who have devoted themselves to the extensive studies which are required.

Certification as an Engineering Technician or Technologist does not necessarily justify an increase in pay or a particular promotion but it does provide for industry a measuring stick against which the qualifications of an individual can be compared. This, of course, is valuable to both the individual and to industry. In addition, it has already been established that the program provides an incentive to those who have been certified to improve their academic status. There is little doubt that industry will favour the men who honestly try to improve themselves and reclassification to a higher grade will draw attention to a man's progress.

As the program has progressed it has become evident that it must eventually grow into an organization which will conduct its own affairs. The Engineering Profession is acting as a big brother for the moment, lending its prestige and providing the money required to finance such an extensive venture. It is to be expected that as long as the Association of Professional Engineers is paying the bills and as long as there

is continued use of the term "Engineering", the Association will want to maintain a close relationship.

On the other hand, far-sighted Technicians, realizing the importance of the growth of such an organization must be prepared to support it and give it strength through their active participation. The strength and importance of any organization will depend entirely upon the number of individuals who give it their whole-hearted support.

## WHAT DOES THE ASSOCIATION PROVIDE

Council of the Association has appointed a Certification Board which is responsible to Council for the efficient operation of the program. It is this Certification Board which must consider all matters of policy, making its recommendations to Council regarding policy changes, and ensuring the implementation of the policies which have been established. It is the Certification Board also which must give the final decision on each application, taking into consideration the merits of academic training and experience and granting certification in a particular grade.

To assist the Certification Board, a Panel of Examiners has been set up to examine academic qualifications only and to make recommendations to the Certification Board on all matters dealing with academic training. To facilitate the work of the Panel, a Syllabus of Examinations for Engineering Technology has been published which details the minimum academic requirements for an applicant who has a Grade XII Certificate and wishes to qualify as an Engineering Technologist.

To give the Technicians representation in this program and to provide a nucleus of Technicians and Technologists with experience in running the affairs of such an organization, two Engineering Technicians or Technologists have been appointed to both the Certification Board and the Panel of Examiners. In addition, an Advisory Committee of Engineering Technicians and Engineering Technologists has been appointed from amongst those already certified. Members of the Advisory Committee were selected so that they might provide regional representation until such time as numbers will permit adequate representation on a regional basis by election. This Committee does very constructive work in advising the Certification Board and in presenting the opinions of the men whom they represent.

In addition to the controlling organization outlined above, a portion of the permanent staff of the Association devotes a great deal of time and effort towards the day by day development of the program.

To the individual whose qualifications have been assessed by the Certification Board, the Association provides a certificate, supported by the prestige and integrity of the Association, which classifies him as a particular grade of Engineering Technician or as an Engineering Technologist. This certificate does not imply membership in the Association but represents a sincere effort to measure a man's qualifications in terms of academic training and experience.

Each application is handled on an individual basis. Academic qualifications are measured against a Syllabus of Examinations for Engineering Technology by the Panel of Examiners. The Certification Board applies the experience factor and is the final judge of the grading which is granted.

For the moment it is possible for those who have less than Grade XII education to achieve certification, provided that they have had progressively responsible experience which would compensate for a lack of academic training. This "grandfathers' clause" type of arrangement permits those who have long years of experience in industry to compensate for a possible lack of formal education. This is extended up to and including Engineering Technician Grade 3. Beyond this grade the applicant must clearly establish that he has the necessary academic qualifications either by providing the documentary evidence or by writing examinations.

In addition to providing the staff and services required for this certification procedure, the Association has extended some of the benefits, normally available only to members, to those who become certified. These include the Association's Group Insurance Plans, its Retirement Savings Plan and its Investment Program. A monthly Newsletter is published for Technicians and each Technician also receives a monthly copy of the Engineering Digest.

## PROCEDURE FOR CERTIFICATION

If an individual is working at a job which at one level or another requires the supervision of a Professional Engineer, the chances are that he can be certified as an Engineering Technician or Engineering Technologist. No examinations are required to begin with but initial classification will depend upon the applicant's previous academic training and his progressive experience. Once certified however, he should be in a good position to judge the amount of academic work he must do to qualify for the next higher grade.

For example, a man having Grade XII or better is eligible to attend Advanced Technical Evening Classes which are sponsored by the Ontario Department of Education in many Ontario communities. Completion of the Advanced Technical Evening Class Grade I Certificate qualifies him academically for Engineering Technician Grade 2 and completion of the Grade II Certificate Course qualifies him academically for Engineering Technician Grade 3. All that remains is to complete the remaining subjects in the syllabus of examinations to qualify as an Engineering Technologist.

Of course previously obtained credits beyond Grade XII can be recognized by the Ontario Department of Education thus permitting individuals to commence more advanced phases of instruction. This is not intended as an easy course of study. High standards of qualification have been set and will be maintained.

Where the formal educational facilities of the Ontario Department of Educations are not available an individual who has been certified may

(concluded on page 16)

# THE MOBILITY OF A FIELD WORKSHOP

By Capt HW Chapman

"Whoever denies mobility to his enemy while retaining his own mobility, will emerge victorious."
- Lt Gen Ronald Weeks, KCB, CBE, DSO, MC, TD

## INTRODUCTION

Mobility, so often decisive in war, has become paramount with the advent of nuclear war. The Brigade Group organization, the increased transportation in the Brigade, improvements in signal equipment and the introduction of fixed wing and helicopter aircraft are all designed to increase the mobility of the Army. The Field Workshop must increase its mobility to at least the same degree. New vehicles have, to some extent, achieved some improvement, but this in itself is insufficient. Further improvements can only be achieved by streamlined drills and a higher standard of training.

## AIM

The aim of this paper is to examine some of the problems related to the mobility of a field workshop and suggest some methods of improving it.

## GENERAL

Mobility is not simply the ability to move; it embraces the whole series of events resulting from the receipt of the Warning Order and culminating in the resumption of full production in the new location. Briefly this series is as follows:

a. Issue of Workshop Warning Order.

b. Despatch of the Advance Party.

c. Issue of Movement Order.

d. Workshop closes down.

e. Marshalling and road move.

f. Unit crosses Release Point and arrives in new location.

g. Setting up and resumption of full production.

## PREPARING TO CLOSE DOWN

As soon as the Warning Order is received, or before if it can be anticipated, all outstanding work has to be disposed of. The classic method of doing this is for the CREME to direct backloading away from the workshop that is to move, thus reducing its load to a minimum immediately prior to the move. Adoption of the Brigade Group

Organization with the principle that the Commander exercises direct command over his administrative services at all times, elimination of the Divisional HQ and the limitation of Corps HQ to tactical command only, makes this method impossible. Disposal of uncompleted work thus becomes a brigade problem, to be solved by the BEME and the CO of the workshop.

Normally during operations it can be expected that repair priorities will exist for critical equipments. These priorities will be instituted by the staff with the advice of the BEME. In a fast moving battle there will be times when the CO will have to establish additional priorities, if he is to provide the most effective service. In most cases he will have to do this on his own initiative without the advice of the staff, a case in point being when a move is ordered. Equipments granted a priority are those required immediately to support the operational plan. The CO, therefore, must keep himself informed of the Commander's mission and plan, and the probable requirements of the brigade units. Equipment given a priority must either be completed before the workshop moves or carried to the new location for immediate completion there. Of the non-priority work as much as possible should be completed before the move commences. It is practically certain that some work will be uncompleted when the workshop has to move; there are three possible ways of dealing with this work, these are:

a. Carry the work to the new location. Small items such as small arms and some radio sets can be loaded onto vehicles in any available space. Larger equipments such as vehicles are more difficult to carry; some can be made runners sufficient to complete the move and some towed or loaded into other vehicles. The danger here lies in loading the workshop with so many crocks that its mobility is reduced.

b. An AWD can be left behind to complete outstanding work. In some cases the tactical situation will prevent this. Care must always be exercised in the use of AWDs as they always reduce the overall efficiency of the workshop.

c. Backload the equipment to another workshop or future workshop location. Equipment so backloaded will be out of the jurisdiction of the brigade, which may have to do without it for some considerable time. Backloading then should be avoided if at all possible, except for non-essential equipment.

If the best use is to be made of the time available before the move starts, the plan for the disposal of uncompleted work should be issued with the Workshop Warning Order. Execution of the plan is the responsibility of the 2IC and the Production Platoon Commanders. As they dispose of their outstanding work platoons must prepare to move by loading their vehicles. During this phase there will always be a demand for labour to dispose of equipments, load vehicles and generally prepare the site for evacuation. It should therefore be a routine drill for Platoon Commanders to report the availability of personnel to the Workshop Sergeant Major who will coordinate their most effective employment. The Workshop Sergeant Major should not hesitate to employ personnel from one platoon in another either to free tradesmen from loading duties or assist tradesmen in completing work. There are

many instances where a gun mechanic can be employed as a helper working under the direction of a vehicle mechanic and vice-versa.

Practicing this phase of a move is probably one of the most difficult problems of a field workshop commander. Most formation exercises do not last long enough to produce real problems of this type, or there are not sufficient qualified umpires to provide an exercise load. A certain amount can be learned from carefully planned officer study groups and inclusion of the problem in cloth model exercises and TEWTs. The only real practice, however, is using real equipments. This can be achieved by building up a load in the workshop and then conducting a movement exercise from the home station location. There are two difficulties inherent in this; units have to wait longer than usual for repairs to be completed and realism is lost if the workshop personnel are given too much notice. By careful selection of the exercise timing the first difficulty can be overcome, since most units do not use all their equipment all the time while at home stations. The second one can be overcome by using another form of exercise as a cover plan.

## COMPOSITION AND DUTIES OF THE ADVANCE PARTY

The increased mobility of the Brigade Group, the probable increase in the frequency of moves and the greater distances involved will make it difficult, if not impossible, to reconnoitre a new site prior to moving. Thus the selection of the site and the layout of the workshop will rest entirely with the OIC of the Advance Party. If, as is usual, the Advance Party is commanded by the 2IC then the CO will have little or no control over the location or layout. Because these two factors have a great effect on efficient production, it can be argued that this is only right, since the 2IC is directly responsible to the CO for production. Production, however, is the primary function of any workshop; therefore the CO is vitally involved. He is also responsible for the concealment and defence of the workshop both affected by location and layout. Furthermore, the 2IC has a full time job disposing of all work at the old site and preparing the unit to move, whereas once the CO has given his orders for the disposal of uncompleted work his presence there is no longer essential. The Advance Party, therefore, should be commanded by the CO.

In addition to selecting the site and laying out the workshop the Advance Party must sign the route from the Release Point, sign the workshop area, plan and if necessary prepare the location of each vehicle, prepare a defence plan and prepare to receive the unit when it arrives. To assist the CO in these tasks he should be accompanied by the CSM, whose main duties are signing and assisting in the preparation of the defence plan. The CSM should have a junior NCO to assist him. Each platoon should also provide a responsible NCO to plan the layout of his platoon in detail and guide vehicles into their locations. Each NCO guide should have a driver who can act as his assistant. The advance party then should consist of: CO and driver operator, CSM and assistant, and three NCO guides and drivers; a total of one officer and nine men mounted in five jeeps. In this way the Advance Party is mobile and the minimum number of personnel are taken from the workshop at a critical time.

For daylight occupation a harbour area may have to be selected for vehicles waiting to enter the site. At night tape should be laid to mark routes, and guides should wear white armbands so they can be easily recognized. Platoon guides should have a sketch of the layout available for the Platoon Commander as soon as he arrives.

Advance Party training should follow the normal sequence of TEWTs, platoon exercises, then unit exercises. Platoon Commanders must attend all TEWTs so they can be sure that guides are fully aware of their policies. Care must be taken to provide depth to the organization by training alternates for each position in case of temporary absences of one or more persons.

## COMPOSITION OF O GPS AND GIVING ORDERS

The criteria of good O Gps are as follows:

a. Are orders given and received quickly and accurately?

b. Are they passed rapidly, accurately and in an easily understood manner to the individual craftsman?

To achieve these, O Gps must be kept small but must include all these who need to receive the orders; orders must be clear and concise and must follow a predetermined pattern; and drills for O Gps must be known by all ranks.

The composition of O Gps must be published in Unit Standing Orders and should be used at all times, whether in the field or not. Additions, sometimes required due to peace-time conditions, should be carefully screened and included on an 'as required' basis only. The following are the suggested compositions of O Gps:

a. Workshop O Gp

CO
2IC
Platoon Commanders (3)
Workshop Sergeant Major
CSM

b. Platoon O Gps

Platoon Commander
Platoon 2IC (if there is one)
Section Commanders.

Giving and receiving verbal orders is a skill requiring continuous practice, particularly in peace-time with its great reliance on written instructions. The normal staff duties format should be adapted to the workshop organization and used at all times. In this way no points are overlooked and those receiving the orders know what to expect and can follow the orders easily. The use of maps and other intelligence is an important aid to all orders, including movement orders. For this purpose it is suggested that an intelligence officer be appointed; either the Administration Platoon Commander or his 2IC is best suited to this task. He should be prepared to present an accurately marked map and a summary of the situation including probable developments at all O Gps. To obtain this information he should accompany the CO on all visits to Brigade Group HQ.

Practicing O Gps is a relatively simple matter and because of this is often overlooked. At home stations O Gps should be held regularly, say once a week. During formation training the situation changes so quickly a daily O Gp is practically mandatory. The CO and 2IC should attend platoon O Gps and offer constructive criticism and also check frequently to ensure that orders are reaching the individual craftsman accurately and rapidly.

## MARSHALLING AND ROAD DISCIPLINE

Marshalling by day must, of course, be done from undercover, 'lining up' cannot be accepted. An efficient drill and precise delegation of duties is required to do this. Each packet commander must be responsible for marshalling his packet, and one person, preferably the Workshop Sergeant Major, responsible for coordinating packet commanders and despatching packets at the correct intervals. The aim should be to remove camouflage as late as possible, leave hides and move directly to the Start Point.

To facilitate deployment at the new site the order of march should be such that those vehicles farthest from the entrance arrive first and vice versa. Most workshop layouts have Weapons and Wireless Platoon farthest from the entrance and HQ Platoon and Transport and Recovery nearest the entrance. It is, therefore, suggested that the standard order of march be

Weapons and Wireless Platoon
Spare Parts Stores Section
Vehicle Platoon
HQ Platoon
Transport and Recovery Section.

An exception to this is that at least one vehicle of the HQ Section, preferably the Unit Orderly Room, move as part of Weapons and Wireless Platoon. This vehicle is required in position early to establish the unit command post. There should be very few occasions when this order of march has to be changed.

Once across the Start Point the convoy is under the control of Brigade Group HQ or a movement control staff. If the maximum use is to be obtained from roads, road discipline must be strictly enforced. Spacing and speeds have to be adhered to. Drivers should be instructed in using time and distance as a means of maintaining position in place of speed alone. Drills and signals have to be worked out for air and ground attack and all drivers must be impressed with the urgency of proceeding despite all obstacles.

Frequent moves under day and night conditions are required to develop smooth and efficient drills. In the early stages drivers require instruction prior to movement exercises and de-briefings should always be conducted after the move. Exercises should be planned to practice diversion drills, and drills in the event of attack.

## ACTION AT NEW SITE

Immediately a driver arrives in the new site and positions his vehicle he must camouflage and dig passive air-defence trenches. Once the Platoon Commander is satisfied his vehicles are being deployed correctly, he should make himself familiar with the area and report to the unit command post for defence orders. Slit trenches should then be dug and sentries posted. It is during this phase that the unit is most vulnerable and speed in reorganizing is essential. Line must be laid and telephones manned; alternate line to platoon defence command posts must also be laid. As soon as camouflage and defence preparations are completed the Platoon Commander must report his situation to the unit command post.

## CONCLUSIONS

The adoption of new doctrines and organizations has presented all corps with problems to solve. One of the most difficult in so far as the Field Workshop is concerned is the need for increased mobility. The crux of this problem is to reduce the time required to perform all the extraneous tasks and thus increase, or at least maintain, the same amount of productive time. In general this can only be done by improved drills and training and repeated practice in actually closing down, loading, moving and then setting up again. When the point is reached that these drills eliminate all waste time and are clearly understood by all concerned, then the necessary mobility will be achieved. In particular workshops should practice O Gps and Advance Parties so that their actions are second nature; disposing of uncompleted work should be carefully studied so that the maximum service can be given and finally, as many actual moves carried out as possible with the emphasis on marshalling, road discipline and setting up.

## ORGANIZATION OF STATIC RCEME UNITS, GENERAL

Your attention is invited to the EME Manual, Static Operations C 100 (including amendment of 28 Nov 60) which describes the organization of static workshops and companies. It also includes information on statements of duties.

LOOKING AHEAD WITH CANADA (continued from p 10)

apply to the Certification Board for an examination program so that by private study he may qualify in accordance with the Syllabus of Examinations for Engineering Technology.

It should be recognized that the Technician Program is not a stepping stone to the Engineering Profession. Rather, it is intended to establish the qualifications and prestige of a group having an entirely separate type of education from that of a Professional Engineer and it is to be hoped that those who earn the title of Engineering Technician or Engineering Technologist will be justly proud of it.

## RCEME TECHNICIANS PRODUCE A PROTOTYPE AIRCRAFT GROUND HEATER FOR RCAF

By Maj AGM Maitland

Quite a few of our RCEME personnel are attached to RCAF stations across the country these days for in-job-training in aircraft and helicopter maintenance and repair. The Air Force has been very cooperative in taking on this extra commitment to train our personnel and we are indeed indebted to them. The exchange has not been all one-sided, however. Our boys have taken their share of duties along with their brothers in blue and have, in many other ways, contributed to life and work on these stations.

One fine example of this was the design and fabrication, recently, by army personnel at RCAF Station, Greenwood, Nova Scotia, of a portable aircraft heater for winter operations. The following is a condensation of a report on this project submitted to me by WO 1 FH Leach who was responsible for this undertaking.

The RCAF had a requirement for a light easily transportable ground heater for light aircraft such as the Otter and helicopters engaged in winter operations in areas where few, or no ground facilities were available. The Herman-Nelson heater, the standard ground heater used on most RCAF stations, weighs approximately 350 lb and is therefore too heavy and bulky to meet this requirement. In the Spring of 1959 S/L JE Ledbetter, Officer Commanding 103 Rescue Unit, RCAF Station, Greenwood, asked WO 1 Leach if he would undertake the design and construction of a heater to meet this requirement and the production of necessary blue prints if a suitable prototype were produced. WO 1 Leach accepted the task.

"After some study and thought, WO 1 Leach decided to convert a Janitrol S 200 heater as used in the Vertol H-21 helicopter to meet the requirement. He enlisted the help of S sgt K Sturley RCEME and Sgt W Joudrey RCASC, both attached to RCAF Station, Greenwood, on the construction portion of this project. Construction was started in Jun 59 and by Sep 59 the prototype was ready for its initial test and all blueprints had been produced. The initial test was highly successful and showed that the army boys had done their work well. The prototype weighed only 89 lb as compared with 350 lb for the Herman-Nelson and had a BTU output of 200,000 units against the 250,000 units for the Herman-Nelson. Fuel consumption of the prototype was 15 lb per hr. Fuel consumption of the Herman-Nelson heater is unknown.

The prototype heater is portable and can be lifted into and out of an aircraft by one man as shown in Fig 1. It can be operated using the aircraft's own fuel supply by means of an adapter, Fig 2, or from external sources such as a Jerry can. While the Herman-Nelson heater is self-contained and has its own power supply, the prototype heater requires an auxiliary power unit to operate it. This was not considered to be a disadvantage on winter operations, however, as an auxiliary power unit must always be carried under these conditions for starting the aircraft.

A field test of the prototype heater, carried out in April 60, proved that it was safe, economical and efficient in all respects and met the requirement for which it was designed. On 12 Apr 60, Otter 3685 left Greenwood for Seven Islands and Knob Lake to carry out cold weather tests on this heater. The following equipment was included:

a. Experimental ground heater complete with ducting;

b. Engine cover for Otter aircraft and three augmenter tube covers;

c. A portable auxiliary power unit.

Tests were carried out at Seven Islands Airport and Knob Lake Airport. On the night of 14 Apr 60 the temperature at Knob Lake was -11°F. The aircraft engine oil was diluted for approximately three minutes, all covers were installed and the aircraft was left outside overnight. The next morning when the test was commenced it was -2°F. Preheating of the aircraft was started at 0820 hours. Heat was applied by inserting one heater duct into one augmenter tube while the three remaining augmenter tubes were covered. The other heater duct was inserted into an opening in the belly of the aircraft below the oil tank. At the beginning of the tests the following temperatures were recorded:

a. Engine oil temperature – 20°C

b. Carburetor air temperature – 20°C

c. Cylinder head temperature – 20°C.

After applying heat for twenty minutes, the following temperatures were recorded:

a. Engine oil temperature 40°C

b. Carburetor air temperature –10°C (not in direct line of heat application)

c. Cylinder-head temperature 10°C.

At 0840 hrs, a start was attempted using only the aircraft battery. The engine started quickly and smoothly. In addition, the aircraft cockpit was comfortably warm. The engine oil temperature recorded after only 20 minutes of heat appeared high. This was accounted for by the fact that the "Y" drain where the oil temperature sensing unit is located was fairly close to where the heat was applied. After starting the engine the oil temperature quickly stabilized at 10°C giving a net increase of 30°C during preheating. There is no doubt that considerably improved oil circulation resulted from preheating."

I feel that WO 1 Leach, S sgt Sturley and Sgt Joudrey are to be congratulated for their efforts on this project. Not only have they shown that the army technician still has the ability to improvise as he did during the Second World War but they have performed a valuable service for the RCAF, thus strengthening the strong bond that already exists between RCEME and the RCAF.

Fig 1 - S sgt K Sturley Demonstrates the Heater's Portability (RCAF photo)

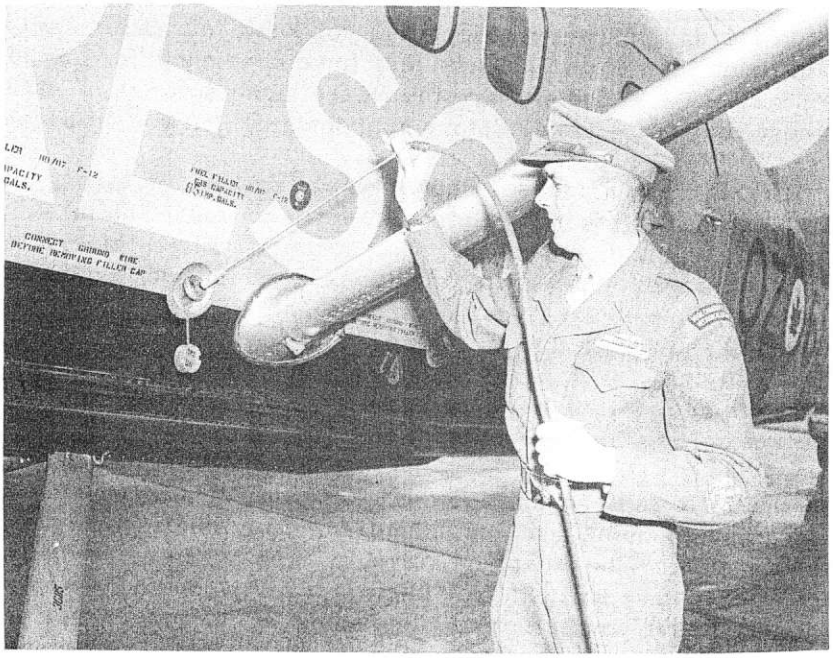

Fig 2 - The Fuel Supply Assembly Being Fitted to an Otter Aircraft by WO1 FH Leach (RCAF photo)

# HOW FAR CAN YOU GO

By Lt Col AG Sangster

Remember your last promotion? Did it start you off on a series of accelerated or normal promotions or did you get stuck in a rut? If you got bogged down, maybe you had better take an honest look at yourself whether you are Corporal or Colonel.

Maybe the secret lies in reluctance to pass the detail on to the level you were on yesterday. This is a recognized weakness in industry as well as in the armed forces. Promotions are experiments in human nature to find out, in small steps, how much responsibility you can accept and the extent to which you can delegate and decentralize. These are characteristics which determine how far you can go up the ladder.

Let us start at the bottom and see what happens and at what points in a career the men are separated from the boys.

In the case of a tradesman let's start at Gp I and assume you are competent and ambitious. You spend your time at in-job training and in due course you are up-graded. Your hooks are hanging there waiting for a vacancy to come up. This is a big hurdle for you and it will shape your career.

Yesterday you were with a gang you knew intimately and presented a solid front against an NCO who may have been weak for any of a number of reasons. Today you are the NCO. Are you weak or strong? Can you trust your tradesmen? More appropriate, can you trust yourself?

There are two courses open to you. You can be strong and show your confidence in your subordinates, let them make the mistakes you made yesterday and correct and protect them. Alternatively, you can be weak and interfere in their work to be sure the job is done right. The second course saves your neck all right but does not pass on your knowledge, and shows that you either want to prove superiority (to yourself) or you are afraid one of your subordinates may overtake you. Your hooks are visible evidence of your superiority and you are now in a position to help the new boys up.

The next critical point comes when you get your Queen's Warrant. You now have become a minor executive. In a small workshop you are more than that. Wherever you go you will be accepted as one who has achieved executive status. You must now dirty your hands only in emergency. You have competent artificers and NCOs working for you. You no longer need to prove your own trades skill. After all you are an executive.

The next step has two barbs to the hook. This is the Queen's Commission. The artificer being commissioned carries with him a wealth of practical experience in his trade and a knowledge of human nature that only comes with years of man-management. On the other hand the university graduate has virtually no knowledge of man-management and an academic, as opposed to a practical technical, knowledge.

Arriving together in the Officers' Mess, the young engineer and the classified officer start together to learn the intricate pattern of the life of an officer. On the one hand a young man, probably with a young family; and on the other, a mature man with possibly a grown-up family, are trying to integrate into a new way of life. Integration of the wives must be left to them, since female reasoning is only associated with male logic by coincidence if at all.

The real integration problem at the officer level comes when the classified officer cannot forget his days as a tradesman. He has something practical to bring with him. The university officer has little practical knowledge to bring with him but he knows the 'why' to many questions.

The classified officer must respect the specialized training of the engineer just as the engineer must respect the experience of the classified officer.

At all levels you must learn to shed the detail of your last step as you move up. If you don't, you'll stop moving.

## CONTRACTS

By HC Mussell DEME

This and following issues of the Technical Bulletin will contain a series of articles on contract procedures. The articles will consist mainly of items of information which are not included in the present instructions. This issue will cover Annual Estimates. Following issues will include Allotments, Petty Cash (The EME Manual instruction is just out), LPOs, PRs, and DEWAOs.

### ANNUAL ESTIMATES

As you will recall, the estimates for 61/62 were requested and submitted on the staff net. There will be a minor change in 62/63, in that base workshop estimates will be on the RCEME net. This is because we now deal direct with the base workshops on allotments, and the Montreal and London Accounts Offices merely record and report the base workshop financial activity.

DEWAO funds are controlled by DEME. Despite this, we will again ask that your command DEWAO needs be included in the estimates which you submit through staff channels. This procedure will eliminate separate submissions on the RCEME net. The inclusion of DEWAO amounts in the staff submission is not intended to place any responsibility for supporting these amounts on staff officers, unless they so desire. It might be advantageous to mention this to the staff officers concerned.

Now for the actual estimating. Since spending in commands and base workshops has become reasonably steady, the simplest method for arriving at a fairly accurate estimate for Primary 79 (LPO and PR) is to consider each object in the Primary and start with the actual expenditure for the year just completed. This information can be obtained from the local Accounts Offices. Let us assume that a company is preparing estimates for 62/63, and that the actual expenditure for telecom equipment in 60/61 was $773. Assuming there is no change in the number of equipments to be serviced, in workshop tooling (mainly test equipment) or workshop establishments, and taking into consideration the slight increase in the cost of labour and material since the beginning of 60/61, the estimated need for 62/63 will be approximately $800. However if many equipments have recently been replaced by new equipments, or if workshops have received improved and/or additional test equipment, the 62/63 need should be less than 60/61. If the workshop tels establishment has been reduced thereby causing a periodic increase in the number of repairs by contract, this will result in an increase in contract expenditure. DEWAO amounts are subject to similar considerations. If GM Standard Commercial (SC) vehicles were replaced in 60/61, by IHC SCs, the GM and IHC need for 61/62 will be small (the GM vehicles have disappeared, and the IHC vehicles are new). By 62/63, however the IHC vehicles will need repairs and funds should be included in the estimates.

A word of caution! Do not 'over-estimate'. If workshops, companies and commands each add 10% 'padding', the resulting estimates received at DEME cannot possibly be supported. It is recommended that companies provide commands with the LPO and PR amount and each DEWAO amount to the 'nearest hundred' and that the command amounts be reported to AHQ to the 'nearest thousand'.

With your cooperation, the preparation, support and eventual approval of the annual Army Estimates for Primary 70 presents no real problem.

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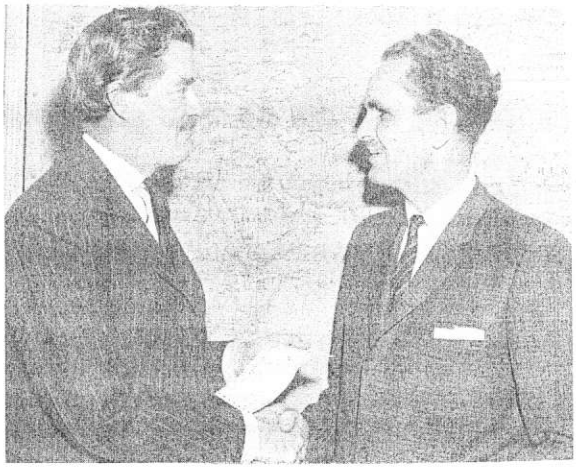
## ADDITIONAL AWARD FOR CAPT GILBERT



Maj Gen RW Moncel, QMG, presenting a cheque to Capt AM Gilbert as an additional award for his suggestion of a radiac point calibrater. See the RCEME Technical Bulletin of Oct 1958.

## VCGS CONFERENCE

The VCGS held a conference at the Canadian Army Staff College from 24 - 27 Oct 60 to study the tactical concepts outlined in the new pamphlet CAMT 1 - 8 "The Infantry Brigade Groups in Battle, Part 1 - Tactics" and the logistics concepts to support it.

During the conference all Corps directors were given an opportunity to state the changes they expected to make within their Corps to support these new concepts. They were also asked to state the changes they could forsee within their Corps during the next five years (1960 - 65).

The following is the DEME address given at this conference.

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### MISSION

Our mission is to provide service, and Corps units are designed to be flexible in organization so that best use can be made of RCEME support. Maintenance overhead is, however, causing us some concern.

### OVERHEAD

The maintenance overhead of a formation will continue to rise as more complex equipment is introduced and numbers increase. This chart shows how the proposed introduction of the Bobcat will increase the overhead.

### REPAIR SUPPORT

### REQUIRED IN UNITS DURING OPERATIONS

| Vehicle | 1 Tradesman per |
|---|---|
| Truck 3/4 ton | 15 vehicles |
| Truck 1/4 ton | 10 " |
| Truck 2 1/2 and 5 ton, and Scout Car | 7 1/2 " |
| Truck 10 ton | 6 " |
| Bobcat | 3 " |
| M4A2 (APC Model) | 2 " |
| Centurion | 1 1/2 " |
| Light Aircraft and Recce Helicopter | 1 " |

The British are now running a trial in Germany with a battalion equipped with APCs. The APC is the Saracen which as you know is a wheeled vehicle. The strength of the LAD supporting this battalion is 1 officer and 78 other ranks and this will give you an idea of what we are up against.

Management has been introduced into the Corps as a basic military subject in order to help reduce the maintenance overhead and it is now starting to pay dividends.

## CURRENT ORGANIZATION

The operation of a forward repair platoon within the Brigade with teams capable of repairing casualties in the forward area has proven successful. This platoon will normally be sited in the vicinity of the A echelons and teams will repair equipment casualties by exchange of assemblies.

The balance of the workshop will continue to be sited in the brigade administrative area and form the main repair group.

The recovery organization is completely flexible and can be readily adjusted to suit changing conditions.

From Division rearward we will have no difficulty fitting our organization into the British system but a lack of standardization on equipment, spare parts and tooling will cause some difficulty. Fitting into an American system would be even more difficult unless we were using their equipment.

## CHANGES EXPECTED (1960-65)

The first and most important change is that in the future drivers will perform servicing and the simpler unit repairs. Trials will be run in Germany next year to determine how much they can do. Training for this has already started and the first unofficial report is fairly promising. This may result in a decrease in tradesmen but it will be the spring of 1962 before the results can be evaluated since the trials will run for a full 12 months. Officers and NCOs of the units concerned will require some training in maintenance supervision.

The second change that can be expected is that RCEME mechanics will be made organic to units and LADs will disappear. These mechanics will be organic to F, A and B echelons in the numbers required by user units and the internal allotment, organization and management of these mechanics will be a unit responsibility. This will give the commanding officer complete control over his RCEME resources.

Next, units will be assigned the responsibility for diagnosing equipment faults. The operation of the forward repair platoon is dependent on complete and accurate diagnosis by the unit and efficient administrative communication in the forward area. A set on the forward administration net will be sufficient for this platoon.

The next change is that the field workshop will be reorganized for even greater flexibility and the new organization will include facilities for aircraft repair when more aircraft are procured. This work will be performed at the airstrip or helipad. RCEME tradesmen are now maintaining the L19s of the AOP troop in Germany.

Within the next five years we can expect to see trials carried out using cargo helicopters in the recovery and backloading role and we hope they will provide better and faster service with lower overhead but this still must be proven. Their flexibility, however, cannot be denied.

## CONCLUSIONS

The Corps will strive for speedy repair with the lowest possible overhead but the continual increase in equipment holdings is bound to increase the maintenance overhead unless a higher degree of reliability is built into equipment. The reliability factor of any new equipment should be studied and carefully weighed before new types of equipment are purchased.

We will have to pay a price for increased mobility both when APCs are introduced and again when helicopters are introduced.

Military characteristics should not be written any more rigidly than absolutely necessary because any increase in performance demanded of equipment will almost invariably increase the maintenance overhead.

## SUGGESTION AWARD

On 13 Dec 60, S sgt JM Ronan, DEME, was presented with a cheque for $295 by Col RA Campbell, the Director, on behalf of the Suggestion Award Committee of the Public Service of Canada. Army and civilian personnel of DEME attended the presentation.

S sgt Ronan, in collaboration with Capt DM Maher, developed a decontamination cabinet to be used in the safe repair of small pieces of equipment which contain radioactive materials.

The CGS, Lt Gen SF Clark, in a letter to S sgt Ronan, wrote:

"I am pleased to learn that you have been granted an award for the suggestion which was submitted jointly by you and Capt Maher and which provided a safe method for using radioactive material to repair small pieces of equipment.

Modern equipment and procedures are so complex that there is a great need for ideas such as yours which help to improve the efficiency of the Army.

I would like to take this opportunity to thank you personally for the interest you have shown in developing this equipment, and I hope the Army will continue to benefit from your constructive ideas."

(The presentation to Capt Maher is shown on page 32)

# PRINCIPLES OF MAINTENANCE

by Lt Col AM Reid

Since its formation more than 16 years ago our Corps has been beset by numerous problems but has won the battle for survival. During this period the Corps has been hard pressed to continually give service to its 'user units' and at the same time develop and expand its military and technical skills.

It seems appropriate that we should now take stock, consolidate our gains and commit to paper the policies that we have followed, although sometimes unknowingly, and the rules of procedure which have brought us success.

In this article I would like to list the Principles of Maintenance which I believe we have generally followed in the past and which have evolved from an analysis of our achievements. They apply to field operations.

## PRINCIPLES OF MAINTENANCE

1. The use of approved terminology is essential to an intelligent communication of ideas.

2. Maintenance overhead is proportional to the quantity, complexity, variety and reliability of equipment.

3. Unit commanders must be assigned specific maintenance responsibilities and must command the personnel responsible for performing the work.

4. The maintenance system must be enforced by inspections, education and advice.

5. Repair can be effected only when skilled labour, tools and parts are all applied to the casualty at the same time.

6. Rapid and accurate diagnosis as far forward as possible will permit more rapid repair.

7. Repairs must be carried out as far forward as possible.

8. The maintenance organization must be flexible in order to be capable of deployment to suit the tactical plan.

9. The keeping of simple maintenance statistics is vital to an efficient maintenance operation.

10. The procurement of new equipment must be accompanied or preceded by the procurement of appropriate tooling parts and training.

11. The maintenance organization should use the communications provided for administrative purposes in order to keep communications overhead low.

There may be other principles but they will surely come to light with further study.

I hasten to define the word maintenance at this time in keeping with out first principle. The following definition will appear in our new pamphlet CAMT 11-5 "RCEME TERMINOLOGY" which we hope to have published within a few months:

| | | |
|---|---|---|
| Maintenance (of equipment) | - | Any action taken to keep equipment in a serviceable condition or to restore it to a serviceable condition when unserviceable. Thus maintenance includes servicing, repair, inspection, rebuilding, reclamation, modification and recovery. |

You will no doubt have observed by now that we are currently violating some of these principles, notably principle number 3. The commanding officer of an infantry battalion commands only a portion of his unit repair personnel. The remainder are under command of the LAD commander who in turn is under command of the brigade commander. We plan to correct this situation in the near future by abolishing the brigade LAD and parcelling it out to battalions.

There is little we can do in principle number 2. These decisions will be made outside the Corps and probably the best we can do is to give accurate and timely advice to the staff.

Principles 4 and 5 are generally followed.

Principle 6 is now being followed and will result in units being assigned the responsibility for diagnosis of faults. Principle 7 is similar in intent and has resulted in the formation of the forward repair platoon. This platoon will be shown in the new field workshop establishment which will be published shortly. The remainder of the unit will be reorganized for greater flexibility in keeping with principle 8.

Principle 9 is self-explanatory and is being followed. In peacetime, however, we are obliged to keep fairly extensive statistics but during operations these will be reduced to the minimum.

Following principle 10 is a never-ending battle but a sincere attempt is being made to adhere to it.

Lastly, we propose to follow principle 11 and not ask for an expensive communications net of our own. I believe the forward administrative net will serve us adequately.

I believe that if we follow these principles and others which may present themselves in the future that we will not go far wrong in planning our field force organizations and procedures.

# ELECTRICAL

## LUMINOUS PAINT DECONTAMINATION

A number of radio equipments in service have radioactive luminous paint on their dials. These equipments are identified on pages 11 and 12 of EME Manual Static Operations V 400 Issue 2 dated 31 Oct 60.

The techniques for decontamination and sealing items that have radioactive luminous paint may be found in the following Instrument EME Manuals:-

A 251/4, Y 800, Y 801, Y 802 and Y 809 Instr 1.

It is the responsibility of the Telecommunication Section foreman and the unit RSO to be completely familiar with these instructions. Although the ultra-violet (UV) lamp is the means of detecting luminous paint particles, spot checks for cleanliness should include both UV inspection and swipe-tests using kleenex monitored with a contamination meter.

## NEW RADIAC EQUIPMENT

The following new radiac equipment will be in service shortly:

Radiacmeter IM 108A/PD
Radiacmeter CDV 710
Radiacmeter CDV 720
Radiacmeter Contamination CDV 700

The total numbers of each item is not known. However it is anticipated that there will be several thousand in service. This anticipated workload makes urgent the necessity for the radio artificer to provide in-job training in radiac repair for the group 2 and 3 radio technicians.

The Radiac Point Calibrator will be modified to include the necessary jigs for the calibration of the new radiac instruments.

## SERVICING RADIAC EQUIPMENTS

The cleaning and dri-filming techniques detailed in paras 3 to 5 of EME Manual Electrical G 304 are skills that are acquired by persistence and care. Technicians servicing radiac instruments sporadically will have to relearn the skills each time. Officers in charge of RCEME Workshops should ensure that the Radiac Training kits are inspected before each training program. In addition to ensuring that the kits are in good condition this will also provide technicians with opportunities to practise these skills.

## RADIO SET C42 INSTALLATIONS

In the near future, the RADIO SET C42 will replace the Wireless Set Canadian No 19 Mk 3 throughout the Canadian Army.

In the past some confusion has existed concerning terminology associated with the installation of radio equipments. To avoid this, the following are definitions of the important terms:

Adapter Kit - This will include the items required to adapt (modify) a basic vehicle so that it is equipped to accept an installation kit. The fitting of the adapter kit will be treated as a vehicle modification in the EME Manual. The code of the vehicle will change when an adapter kit is fitted.

Installation Kit - This includes the items required to prepare a vehicle, to which an adapter kit has been fitted, to accept the basic radio set(s). This is an EIS item on the equipment table of the user unit. Instructions for the installation of this kit and the basic radio sets will be published as an electrical miscellaneous instruction to the radio station in the EME Manual and will also be included in the Operator's Handbook.

Basic Radio Set - This is not a complete radio station, but includes only those radio items common to all complete stations. This is an EIS item.

Radio Station - This comprises the installation kit, the appropriate basic radio set(s) and ancillary items used in a ground role or installed in a vehicle modified for radio use. The term "Radio Station" will be used to avoid the double meaning of the word "installation", ie, the process of installing and the result of installing.

A few months ago, RC Signals requested that the operating instructions, installation instructions and all other technical information on C42 radio stations, required by a user, be published in the form of an Operator's Handbook. Because much of the information would normally be published as EME Manuals and the Manual system could easily accommodate the remainder, it was decided that the EME Manual was best suited for this purpose.

The EIS of each installation kit will include an "Operator's Handbook" which will contain:

a. Operating Instructions for the Radio Station, Radio Set C42, and Radio Control Harness.

b. Data Summaries for the Radio Station, C42 Radio, Power Supply, Tuner, and Radio Control Harness.

c. Installation Instructions for the Radio Station.

The following are the EME Manual designations that have been allotted to the C42 main items and the C42 Radio Stations. Do NOT request these publications. They will be distributed when published.

| Main Items | EME Manual Electrical Designation |
|---|---|
| Receiver-Transmitter, Radio C42 | I 400 - 409 |
| Power Supply, Vibrator No 12, Mk 2, 24 v input | K 240 - 249 |
| Radio Control Harness, Type B | K 760 - 769 |
| Radio Control Harness, Type A | K 770 - 779 |
| Tuner, Radio Frequency, Aerial No 6 | K 550 - 559 |
| **Radio Stations** | |
| Radio Station C42 in Truck Utility, 1/4 ton CDN | L 170 - 179 |
| Radio Station C42/509 or C42/510 in Truck Utility 1/4 ton CDN | L 180 - 189 |
| Radio Station C42 in Truck Cargo 3/4 ton CDN | L 230 - 239 |
| Radio Station C42 in Truck Panel 3/4 ton CDN | L 240 - 249 |
| Radio Station C42/509 or C42/510 in Truck Cargo 3/4 ton CDN | L 250 - 259 |
| Radio Station C42/C42 in Truck Cargo 3/4 ton CDN | L 260 - 269 |
| Radio Station C42/C42/52 in Truck Panel 3/4 ton CDN | L 270 - 279 |
| Radio Station C42/52 in Truck Panel 3/4 ton CDN | L 280 - 289 |
| Radio Station C42/C42 in Truck Panel 3/4 ton CDN | L 290 - 299 |
| Radio Station C42 in Truck Van (Sigs) 2 1/2 ton CDN | L 430 - 439 |
| Radio Station C42/509 in Truck Van (Sigs) 2 1/2 ton CDN | L 440 - 449 |
| Radio Station C42/C42 in Truck Van (Sigs) 2 1/2 ton CDN | L 450 - 459 |
| Radio Station C42 National Survival CDN | L 850 - 859 |
| Radio Station C42 in Truck Wrecker 5 ton 6 x 6 w/winch | L 870 - 879 |
| Radio Station C42 Instructional | L 920 - 929 |
| Radio Station C42/510 in Centurion Tank CDN | M 320 - 329 |
| Radio Station C42/C42/510 in Centurion Tank CDN | M 520 - 529 |
| Radio Station C42 in Scout Car (Ferret) CDN | M 610 - 619 |
| Radio Station C42/510 in Scout Car (Ferret) CDN | M 620 - 629 |
| Radio Station C42 in Centurion (ARV) CDN | M 710 - 719 |
| Radio Station C42/510 in Light Tank CDN | M 740 - 749 |

## VEHICLES

### TRIUMPH MOTORCYCLE GREASE FITTINGS

When difficulty is encountered with the original grease fittings on Triumph motorcycles the fittings can be replaced with a standard Canadian fitting without retapping, by using a "fitting, lubrication, str, spcl, taper thread", as listed in issue scale L/STD Hardware, page 33 item 468.

## PLANS, TRAINING AND ORGANIZATION

### RCEME MILITIA TRADES

It is expected to have the following RCEME Militia trade specifications published early in 1961:

| | |
|---|---|
| Vehicle Mechanic (M) | Groups 1 and 2 |
| Welder (M) | Groups 1 and 2 |
| Electrical Mechanic (M) | Groups 1 and 2 |
| Radiac Mechanic (M) | Groups 1 and 2 |
| Recovery Mechanic (M) | Group 2 |

In addition the following trades are authorized for RCEME Militia units:

| | |
|---|---|
| Clerk Administrative (M) | Group 1 |
| Driver Mechanical Transport (M) | Group 1 |
| Storeman Clerk (M) | Group 1 |

At the RCEME Corps Association Executive Meeting on 21 Oct 60 it was stated that the prerequisite for the Recovery Mechanic (M) Group 2 would be Vehicle Mechanic (M) Group 1. This has been changed and progression will be from Driver Mechanical Transport (M) Group 1 to Recovery Mechanic (M) Group 2.

### PRE-ARTIFICER ASSESSMENT

The pre-artificer assessment training standards have now been produced in small booklet form. This booklet has a RED cover and is dated OCTOBER 1960. All of the yellow booklets dated APR 59 should now be destroyed.

No changes have been made to the academic portion of either standard. The major changes are:

a. Annex A paragraph 3 details special instructions for the new trade of Weapons Artificer.

b. The lists of equipment shown in Annexes A and B used for the trade assessment have been revised.

These booklets were issued in bulk to commands under HQ 3675-A15 (ME 1) on 28 Nov 60 and should be available at your orderly room or library.

It is interesting to note that the British Army has adopted a very similar system of assessment.

### PERIODICALS

DEME arranged through DOS for subscriptions to the following periodicals during 1960 for Commanding Officers Base Workshops,

Command EMEs, RCEME School and Manitoba Area EME:

a. Harvard Business Review

b. Factory Management and Management Maintenance

c. Advanced Management.

Subscriptions for 1961 will be made on the same distribution but Management Methods will replace the Harvard Business Review. Recipients should ignore the requests for renewal sent direct to them from the publisher.

Your suggestions for other informative and useful periodicals to be subscribed to should be sent to DEME.

Capt DM Maher receiving his share of the Suggestion Award money, and his certificate, from Brig AJB Bailey, Eastern Ontario Area Commander.

# TRADES PAY, TRADE GROUPINGS TRADES TRAINING AND TRADE TRENDS

By Capt FF Doherty

## GENERAL

After many months of intensive study and conferences, new rates of pay were authorized by Treasury Board on 31 October 1960 retroactive to 1 October 1960. The aim of this article is to bring all personnel up to date on the latest changes in all RCEME trades.

## TRADES PAY

The rates of trades pay now authorized are:

Group 1 - $12.00 a month - no change
Group 2 - $30.00 a month - no change
Group 3 - $54.00 a month - no change
Group 3A - $63.00 a month - new rate and group
Group 4 - $72.00 a month - no change
Group 4A - $90.00 a month - new rate and group.

## TRADE GROUPINGS

The allocation of trades to the new groups 3A and 4A in the three services was made by the Treasury Board based on evaluation figures supplied by the responsible sections of each service. In the Army, the Job Analysis Section of the Directorate of Organization did many months of study and put in many hours of overtime to arrive at fair evaluation figures for all Army trades.

The following is a list of all RCEME trades and trades applicable to RCEME and their authorized groups. Trades which were allocated to a higher group are indicated by an asterisk (*):

* Aircraft Artificer Group 4A
* Airplane Technician Groups 2 and 3A
Assistant Instructor RCEME Group 3
Bandsmen (all classes) no change
Body Repairman Groups 1, 2 and 3
Clerk Administrative Groups 1, 2 and 3
Communication System Artificer Group 4
Communication System Technician Groups 1, 2 and 3
* Draughtsman Electrical and Mechanical Groups 1, 2, 3A and 4A
Driver Mechanical Transport Groups 1 and 2
Driver Radio Operator Groups 1 and 2
Electrical Artificer Group 4 (see Trades under discussion)
* Electrical Mechanic Groups 1, 2 and 3A
* Fire Control System Artificer Anti-Aircraft Group 4A
* Fire Control System Technician Anti-Aircraft Groups 1, 2 and 3A
* Helicopter Technician Groups 2 and 3A
* Instrument Artificer Group 4A
* Instrument Technician Groups 1, 2 and 3A
* Machinist Fitter Groups 1, 2 and 3A
Projectionist Clerk Groups 1 and 2

* Radar Artificer Group 4A
* Radar Technician Groups 1, 2 and 3A
* Radio Artificer Group 4A
* Radio Technician Groups 1, 2 and 3A
  Steward Groups 1 and 2
  Storeman Clerk Groups 1, 2 and 3
  Typewriter Mechanic Groups 1 and 2
  Vehicle Artificer Group 4 (see Trades under discussion)
* Vehicle Mechanic Tracked Groups 1, 2 and 3A
* Vehicle Mechanic Wheeled Groups 1, 2 and 3A
  Watchmaker Groups 1, 2 and 3
* Weapons Artificer Group 4A
* Weapons Technician Groups 1, 2 and 3A
* Welder Groups 1, 2 and 3A.

## TRADES UNDER DISCUSSION

The trades of Electrical Artificer and Vehicle Artificer have not been reclassified to date. They are among those in the three services which are being reconsidered and re-evaluated by the Inter-Service Trades Committee (ISTC). If the ISTC considers that these trades warrant higher grouping, they will be resubmitted to the Treasury Board for their further consideration. These are the only RCEME trades which are still being studied and discussed.

## TRADES TRAINING

The trades of Weapons Artificer and Weapons Technician Group 3 have been placed in groups 4A and 3A respectively. However, these higher groupings do not apply to the former trades of Armament Artificer, Small Arms Artificer, Gun Mechanic and Armourer. Tradesmen in these trades must requalify in the new trades before authority to draw the higher rate of trades pay can be granted.

Armament Artificers and Small Arms Artificers must attend a conversion course at RCEME School before they can be remustered. It is expected that by 1 Aug 61, all artificers will have completed the conversion course.

The specification for Weapons Technician allows two methods of requalifying Gun Mechanics and Armourers. One is by a conversion course at RCEME School and the other by in-job training and trade test. Due to the numbers involved and the limited capacity of the School, it is imperative that units commence in-job training immediately. Gun Mechanics Group 3 and Armourers Group 3 should be given training in the functions of the new trade which formerly belonged in the opposite trade. While the emphasis should be on in-job training for group 3 tradesmen, groups 1 and 2 tradesmen should also be given the opportunity to requalify as soon as possible.

While on the subject of in-job training, all officers, WOs and senior NCOs are reminded that in-job training in all trades is one of their prime responsibilities. This applies particularly to those

groups of a trade where qualification to a higher group is by trade test. A properly laid-out programme should impose no restrictions on production and should result in higher morale and a higher standard of technical efficiency.

## TRADE TRENDS

The trades of Moulder, Pattern Maker, Tire Repairman and Toolmaker were not shown in the above list of trades as they are being deleted as authorized trades. Tradesmen now in these trades will be given an opportunity to requalify in another trade. (See Canadian Army Manual of Trades and Specialties para 6.3.)

The trades of Communication System Technician and Communication System Artificer have not been reclassified to date because all trades in the electronic and electrical fields are due for restudy and rewriting. It is expected that most trades in these fields will be changed considerably as many new equipments are being introduced. When new specifications are prepared, these revised trades, or new trades if required, will be evaluated and recommended by D Org for the higher trade groupings if warranted.

The Aircraft Artificer, Airplane Technician and Helicopter Technician trades have been allocated to the higher groupings. However, qualified tradesmen in these trades cannot draw the higher pay until such time as establishments are approved and these tradesmen are posted to cover appropriate establishment positions for their trade. Trade tests are being prepared for both groups 2 and 3 in both trades and it is hoped to have them issued early in the new year.

The trades of Vehicle Mechanic Wheeled, Vehicle Mechanic Tracked and Vehicle Artificer are now being rewritten. Extensive changes are being made in their structure which may call for some retraining in certain groups.

## RADIO C42 EQUIPMENT COURSE

No C42 equipment courses will be run in the 1961-62 training year. When the present serials are completed, enough radio technicians and artificers will have been trained to cope with the anticipated C42 workload.

When C42 radio sets arrive in the workshop, an in-job training program should be set up to train those radio technicians who have not had any previous training on this equipment.

# PRE-ARTIFICER ASSESSMENT

By Major HB Brown

The views expressed in this article are those of the author and do not necessarily represent the views of the Director or the Army.

## GENERAL

Under present conditions it can be stated that our artificers form the technical backbone of our Corps. In the light of this fact, the aim of the pre-artificer assessment, ie, to ensure that the candidate is likely to become an efficient artificer, takes on a very important significance.

If this aim is to be achieved, we must first consider some of the prime prerequisites. Although there are numerous subordinate implications these prerequisites can be briefly outlined as follows:

a. A thorough working knowledge of his trade.

b. A degree of academic knowledge that will not only enable him to pass the assessment examinations and assimilate instruction on a future artificer course but will also have developed his mental powers to the point where he can think for himself and can carry out his responsibilities with a minimum of direction.

c. A high standard of personal character and integrity that will enable him to work successfully with and for other people.

d. A strong desire to progress both academically and in his trade.

Thus, it can be seen that we require much more from the prospective artificer than an average trades knowledge and the ability to change parts. It is feared that too high a percentage of our group 3 mechanics and technicians fall into the latter category. The common conception is that the assessment takes place in April of each year and consists of writing a few examinations at Command writing centres. This is far from the true situation. The assessment starts early in the man's career and only culminates at the writing centres.

## TRADE KNOWLEDGE

It is a relatively simple matter to set examinations for assessing the level of the candidate's trade knowledge. However, it is of doubtful value if consideration is not given to the following:

a. Trade specifications must be up to date in all respects.

b. Trade and EME manuals etc must be up to date and readily available.

c. The prospective candidate must be given the opportunity of becoming familiar with all the equipments upon which he will be assessed.

d. Are our mechanics and technicians becoming primarily parts changers?

e. How much assistance, training and opportunity are given to the individual within his unit to improve his trade knowledge?

## ACADEMIC KNOWLEDGE

The Manual of Trades and Specialties states that the academic prerequisite at the artificer level is grade 10 with an "M" score of 150. However at the group 1 level this prerequisite falls into two general categories of grade 10 with an "M" score of 150 for electronic trades and grade 8 with an "M" score of 130 for mechanical trades. This would indicate that all pre-artificer candidates should be assessed to the same standard. However it is realized that a high standard is more essential in the electronic trades where, in some instances, a working knowledge of grade 13 mathematics is required.

In view of the above, we have prepared two distinct sets of academic papers to reflect the requirements of each of these trade groupings and it is an easy matter to pass or fail a candidate on the basis of examination results. However there are other factors that also warrant consideration:

a. What action has the individual taken on his own, since becoming a Sr NCO, to improve his general academic knowledge?

b. How old is he, how long has he been out of school and in what grade did he graduate?

c. What assistance and opportunity has he been given to improve his knowledge of mathematics, science or chemistry?

d. Has he been assessed and given local training where necessary to improve his technique of preparing correspondence and reports?

A further method for obtaining academic qualifications is the use of DVA courses. This places a greater responsibility upon the individual and has the advantage that it can be extended over a longer period. It would also be much broader in scope. A candidate would be considered qualified when his service records reflect successful completion of a pre-selected number of subjects.

## PERSONAL CHARACTERISTICS

The final decision as to who will be selected for assessment rests with the Command EME, upon recommendations of the individual's commanding officer. It is at this stage that such qualifications as personal character and integrity, ability to work with others and the will to progress must be finally and thoroughly assessed. Observations of the individual's day to day actions, his confidential reports and the attitude and effort he has shown towards improving himself will give a clear indication as to whether or not he should be recommended.

## EXAMINATIONS

The preparation and marking of the assessment examinations are important factors in achieving the ultimate aim. Of necessity the examinations must cover the main requirements of the respective trade specification. The value of each question must be governed by its importance in the trade, its relative importance to other questions on the paper and the time it takes to answer. This is doubly difficult when alternatives are permitted and questions must be of equal value. It is considered that essay type questions, demanding a written answer, are superior to either true and false or multiple choice problems. Therefore, even with a detailed marking guide there can be wide variations among different markers in the interpretation of the candidate's answer. Thus, it must be realized that a single major deviation or several minor deviations in the above procedures could result in an incorrect evaluation of the candidate's qualifications. For this reason great care is taken in marking the assessment examinations.

## CONCLUSION

In the foregoing I have endeavoured to show some of the fundamental reasons for and the procedures which are used in carrying out a thorough assessment. A study carried out in 1959 revealed a need for changing our procedures and resulted in several improvements. A study of the 1960 assessment results brought about additional improvements. However, the assessment will not achieve its full measure of success until the following points have been clarified:

a. Is our responsibility developing into one of primarily changing parts? If so, is there still a need for such a high calibre at the group 3 level?

b. Is the employment of our present artificer more closely allied with the technical detail or with management and supervision?

c. Should the academic portion of the assessment cover more than at present? Perhaps it should include such subjects as English, grammar and letter writing.

d. How can a candidate in a small remote unit with few equipments be assured of equal opportunity with one from a larger unit?

e. A candidate who passes all academic subjects with a higher average than the average of all candidates, yet fails the trade portion, is granted an academic credit. Theoretically he can carry this credit for a minimum of two and a maximum of several years before he is successful in his trade examinations. During this interim period he has had little opportunity to use this information and consequently by the time he is selected for his artificer course it has slipped from his memory. Therefore should a time limit be placed on this credit?

It should now be appreciated that a true assessment is much more than passing a few examinations. It is a continuing activity, requiring the constant attention of everyone responsible for and interested in the future of our Corps. Only by so doing will we ensure that our artificers are of the highest possible calibre.

# SCALING - THE INITIAL SPARES SCHEDULE

By WO 2 JS Anderson

## INTRODUCTION

Whenever the Canadian Army decides to get a new equipment for service use, the immediate maintenance of this equipment in its first year of Army life becomes an urgent problem. If the user is to obtain the full benefit of the up-to-date design and improved efficiency of the new equipment, he must be sure that it will function properly with an absolute minimum of time out for maintenance and repair. This means that the parts for repair must be readily available. The Initial Spares Schedule provides these parts, with particular emphasis on those components which are not already in the supply system in sufficient quantities to meet anticipated usage. The production of this document presents an interesting challenge to the Scales personnel, and a brief outline of the history of a typical ISS may help to give a fuller understanding of this document and its use.

## PRELIMINARY INVESTIGATION

Let us assume that AHQ has decided to equip the Army with a new type of radiation measuring meter which is being produced by a company which we will call Radiation Measurements Laboratories Inc. At the time that the Contract Demand is prepared, it is decided that maintenance spare parts to cover the first 24 months of service will be procured at the same time. DOS then prepare a Request for Scales, one copy of which is sent to the Scaling Section concerned (In this case, Tech Stores Scales Section, Montreal) to warn them that scales will be required for this meter. The Request for Scales will give the CD number, the quantity of meters being bought, the manufacturer's name, the name of the meter, and the Service name and number of the equipment as authorized by DCER. If any parts data is available from the manufacturer, this too is noted.

Other copies of the Request for Scales are circulated to other Directorates in AHQ where estimates of the overall usage of the equipment, cataloguing status, repair policy, etc, are entered, together with any notes as to technical data which may assist the Scales people. TSS request copies of all pertinent publications, drawings, schematics, parts lists, etc, and begin studying these documents, looking for any particular problems which may cause trouble in the repair and maintenance of the equipment.

From all of the data available, a complete list of components is prepared in draft form, ready for further investigation by the Assessor. If a sample of the equipment can be obtained at this time, it is examined in detail by the Assessor, and compared with his draft parts list, to verify that the parts listed are actually the parts being used. He takes note of any parts which may be difficult to replace, either because of location, or for any technical reason, such as causing a change in the performance of the equipment. He also notes carefully what associated parts and accessories come with the equipment, and prepares a list of specific questions which must be answered before he can estimate requirements with any degree of accuracy.

## PREPARING THE DRAFT SCHEDULE

By this time the contract has been awarded to Radmil Inc, and they have prepared the version of the meter which will be accepted by the Army. The Assessor now checks his draft parts list against the manufacturer's parts list, and examines the service model of the equipment. His queries on repairability, rates of wear, etc, are answered by the manufacturer (preferably by the engineer who was responsible for the design of the equipment). At this time the complete list of parts is reviewed, and items are annotated as being Service Repair Parts, Locally Manufactured Parts, Locally Procured Parts, Repairable or Non-Repairable Parts and Assemblies, Operating Spares, Accessories, etc, with any special notes as to how the parts are fitted to the equipment; eg, provided in matched pairs, individually calibrated, etc.

The Assessor is now ready to select the range of items which must be held for the maintenance and repair of the equipment. This list he prepares in draft form, and checks it for items which he can recognize as already in the Service Supply System. The Draft List is submitted to DCER, who check it for items which are already catalogued. These items are listed with their correct Stock Numbers and Nomenclatures. The remaining items are processed for cataloguing. Since this is for a Contractual Document, and the manufacturer needs to know how many of each part he must supply as spares, the processing of the ISS may not be held up until the cataloguing is completed. In this case, the Schedule is prepared using the manufacturer's part numbers and names for all uncatalogued items.

The writing of the Initial Spares Schedule is now begun. The document control number is assigned, and this is the same as the CD number, because the Schedule is being written for the special needs of this CD. Normally, the Schedule is prepared and published in two Parts. Part I details the number of equipments being purchased at this time, and shows all ancillary parts which must accompany the main equipment, including any running spares. Part II details the spare parts which are to be bought with the main equipment. The components are arranged in alphabetical sequence, and listed with the applicable Stock Number or Manufacturer's Part Number. Also listed is the number of times the part is used in this particular application.

Now, in the light of all the information which he has been able to get up to this time, the Assessor calculates what the probable usage of parts will be for each component in the first two years of service. For ease of calculation a basic quantity of 100 main equipments is used, and percentage usage is calculated. This is then either increased or decreased to fit the actual number of equipments being procured, and the quantity of parts required for repair and maintenance at all echelons is entered in the draft scale.

The computation of individual parts is not a straight multiplication factor, since proportionately fewer components are needed to maintain large numbers of equipments than would be required for a small number of equipments. Special attention is given to fast moving items and to items which may be difficult to procure at a later date. In some cases it may even be desirable to make a "lifetime buy" of certain components.

The Draft ISS is now passed to RCOC for the purpose of determining which items are in ample supply for our expected needs. The stock position of each item is checked, and indicated as "Serviceable","Non-Serviceable","Quantity Due In" and "Quantity Due Out", with Issue Experience for at least 12 months. Items which have sufficient stocks on hand are deleted. The figures for other items are adjusted to reflect the present stock status, and the Draft Schedule is now ready for its final form. If the size of the equipment warrants, indexes may be prepared. A rough guide here is that any equipment which has more than 100 scaled parts will have an index.

## PUBLICATION OF THE SCHEDULE

The draft Schedule is now checked for content and format by the assessor and by his supervisor. Any special notes for the manufacturer or RCOC are checked and the wording approved by DEME. The completed schedule is typed on multilith masters, proof-read and corrected, and any last minute changes made. These masters are then shipped to the Scales Branch, DEME, where they are again checked for accuracy. They are then sent to the Queens Printer for publication. After printing, copies are distributed to RCOC, the manufacturer, Inspection Services, DDP and any other interested groups which may be immediately concerned.

## SUMMARY

The Initial Spares Schedule is a list of spare parts which must be procured at the time a new equipment is bought, to ensure that it will be properly maintained and repaired in its first years of use. It is prepared in collaboration with the manufacturer and it tells him how many extras of each part he must provide for when he starts to fulfill the Contract Demand. It warns DOS, DCER and RCEME that these new parts are being introduced into the Supply System, therefore space must be provided for storing them, they must be catalogued for identification and handling, and instructions must be issued as to where and when they may be used and by whom. The information in the Schedule must be as up-to-date as possible, and must be accurate as to the range of parts and the part numbers. Great care is taken to prevent over-stocking of parts, and equally great care is taken to make sure that enough parts are available to meet any foreseeable need. The work done here provides the basis of all future procurement, stockage and issue of parts. This continuing requirement for parts necessitates the preparation of a separate set of documents known as the Provision Schedule and Issue Scales for War and for Canada. These documents will be discussed at a later date.

# DISTANCE MEASURING EQUIPMENT FOR THE CANADIAN ARMY

By WO1 CG Sherman

For the past few years both the Canadian Department of Mines and Surveys, and the Army Survey Establishment, RCE, have been using an electronic distance measuring instrument (tellurometer) to map our northern territories and rough mountain ranges.

The tellurometer is a Union of South Africa innovation and is marketed under the trade name "Tellurometer Micro-Distancer". During 1961-62 it will be supplied to field regiments and SSM (Honest John) batteries of the Royal Canadian Artillery under the nomenclature "Distance Measuring Set AN/TRQ 19". The instrument will be employed in the tactical survey role and will complement current artillery survey methods.

In operation, identical tellurometer units are sited at master and remote locations separated by a clear line of sight. This is necessary because the high frequency radio waves transmitted by the instruments exhibit all the characteristics of light propagation. Distances between one mile and 30 miles can be determined to an accuracy of about $\pm 3$ parts per million of the distance measured. Measurements down to 500 feet and up to 50 miles can also be obtained, although accuracy is slightly decreased at these ranges.

The instrument is ruggedly constructed of special aluminum alloy and weighs approximately 57 lb less its storage battery power source. Physical dimensions of the transmitter-receiver and its telescopic tripod mount are respectively 15 x 12 x 12 inches and 36 x 6 x 6 inches. A haversack carrying case is provided and the overall portability of the instrument is not dissimilar to that of a standard theodolite.

To determine distance the tellurometer measures the time taken for a radio wave to travel from a 'master' to a 'remote' station and return. Since the velocity of wave propagation is known, time can be converted into distance by a fairly simple calculation. A 3000 mc continuous carrier wave generated at the master unit is frequency-modulated by a 10 mc measuring frequency. This composite signal is concentrated by a parabolic reflector and 'beamed' to the remote station where it is received and re-radiated. The return wave is intercepted by the master station and the phase shift between the outgoing and incoming modulations gives a measure of elapsed time. It is indicated by a small break on the circular time base of a cathode ray tube fitted with a calibrated screen. In practice, a number of modulating frequencies in the 10 mc range are used to obtain the extreme accuracy required from the equipment.

Operation of the tellurometer is quite simple and no knowledge of electronics is required. After a very short training period operators can usually complete one set of measurements in about 20 minutes,

including time taken to unpack, set up, demount and repack the instrument. Control between operators at the master and remote stations is maintained by means of a 'built-in' radio telephone with each instrument.

With the exception of the secondary power supply the equipment is not transistorized and standard commercial components are used throughout. A nickel-cadmium battery will supply primary power.

## FIRE PREVENTION AWARD

The Camp Shilo Fire Prevention Trophy for 1960 was awarded to 212 Workshop RCEME, commanded by Capt EJ Stow. The trophy is for open competition among all the units in Camp Shilo. It is awarded annually for (a) good housekeeping; (b) condition of fire-fighting equipment; and (c) alertness of unit personnel. The workshop won also in 1958 when commanded by Capt HV Hann.

Col GP Marriott, Camp Commander, (extreme right) presenting the trophy to Capt Stow and S sgt NL Arscott. Capt G Cantin, RCOC, is on the left.

# WHO'S WHERE

## BRIGADIER

| | | | |
|---|---|---|---|
| JW | Bishop | Comd HQ BC Area | |

## COLONELS

| | | | | | |
|---|---|---|---|---|---|
| RA | Campbell | DEME | EC | Mayhew | DDD |
| RL | Franklin | Chief Superintendent ADE | KH | McKibbin | Adm HQ 4 CIBG |
| CW | Jones | CO 202 Base Wksp | A | Mendelsohn | Commandant, The RCEME School |
| WS | Hunt | MA Belgrade | RH | Ramsay | Tri-Service Language School, Ottawa |

## LIEUTENANT COLONELS

| | | | | | |
|---|---|---|---|---|---|
| VW | Bethel | DSO&P | GT | Kirk | HQ RCEME Eascom |
| GW | Bruce | DEME | AHR | Lewis | HQ RCEME Quecom |
| DA | Campbell | DEME | AL | MacLean | CASC |
| GG | Cavaghan | D Pers (Plans) | IM | McLaughlin | Cdn Arsenals Ltd |
| EW | Coleman | DEME | A | Miller | ADE |
| WM | Dalrymple | 204 Base Wksp | WJ | Owens | ADE |
| CMR | Elmsley | DEME | AM | Reid | DEME |
| H | Goodfellow | HQ RCEME Wescom | HM | Robinson | DEME |
| HW | Hagey | DDD | AG | Sangster | DEME |
| WG | Hamilton | HQ RCEME Cencom | JP | Sherren | DEME |
| RHC | Hodgson | DEME | GW | Thompson | CAS (SHAPE) |
| CG | Kirby | HQ Man Area (ADE Mar 61) | KR | Ward | CAS (W) |

## MAJORS

| | | | | | |
|---|---|---|---|---|---|
| J | Adams | Detroit Arsenals | MA | Dolan | DDD |
| RW | Anderson | 1 Coy RCEME | WE | Ellis | 2 Coy RCEME |
| RA | Auckland | 3 Coy RCEME | HHE | Erb | RCEME School |
| HC | Banham | RCEME School | RF | Fendick | CASC |
| W | Beddard | 204 Base Wksp | RK | Fulford | DDP |
| CH | Betts | HQ RCEME Wescom | JJ | Garnett | HQ RCEME Eascom |
| EP | Bishop | DDP | SA | Girdler | 6 Coy RCEME |
| JC | Boughton | DDD | WH | Glover | RCEME School |
| JH | Bourne | 202 Base Wksp | HV | Hann | 10 Coy RCEME |
| WJ | Branston | 13 Coy RCEME | EJ | Hare | 8 Coy RCEME |
| EM | Brignell | 202 Base Wksp | EJO | Harvey | DEME |
| DD | Campbell | 7 Coy RCEME | TR | Heal | 18 Coy RCEME |
| DG | Carlyle | DQMG (D&D) | EF | Hendricks | DEME |
| BC | Clerke | DDD | EC | Ilott | DEME |
| HL | Cohen | CAS (W) | AJ | Jeffery | 5 Coy RCEME |
| EW | Cole | 4 Coy RCEME | FG | Johnson | DEP |
| KF | Collins | DDD | EG | Jones | 204 Base Wksp |
| JH | Coombe | DEME | FR | Kaye | 16 Coy RCEME |
| FE | Cooper | C&D CALE (18 Comd Wksp REME) | DT | Kennedy | Insp Services |
| F | Coultish | D Pers (RCEME) | VD | Kenyon | CALE |
| KLF | Coupland | RCEME School | HLM | King | ADE |
| BB | Cox | DEME | JS | Kitto | RCEME School |
| AM | Croft | 3 Fd Wksp | RC | Lane | ADE |
| JJE | Cuddihey | Inc 'A' 4 Fd Wksp | CG | Lawrence | 7 Coy RCEME |
| JC | Currie | DEME | RW | Libbey | DEME |
| BM | Deibert | 202 Base Wksp | JL | Loughridge | 13 Coy RCEME |
| FL | Demone | DEME | LH | Love | 2 Fd Wksp |

| | | | | | |
|---|---|---|---|---|---|
| ALD | MacDonell | CALE | M | Ruscher | HQ RCEME Cencom |
| RL | MacDonald | 202 Base Wksp | IC | Scarlett | 204 Base Wksp |
| JH | MacLean | ADE | FJ | Sergi | DDD |
| AGM | Maitland | 6 Coy RCEME | RN | Shaw | RCEME School |
| HE | McLaughlin | DEME | JL | Sloan | ADE |
| H | McManus | 11 Coy RCEME | SG | Tait | 202 Base Wksp |
| GP | Miggins | 12 Coy RCEME | AR | Thomsen | 204 Base Wksp |
| GL | O'Brien | DDD | DJ | Tidy | ADE |
| JN | Pinder Moss | ADE | JM | Treleaven | 4 Fd Wksp |
| HCR | Pfeiffer | 204 Base Wksp | JD | Trevithick | ADE |
| PLW | Platt | DRB | PA | Tuck | 56 Cdn Inf Wksp |
| HF | Protheroe | 1 Fd Wksp | RW | Vollett | ADE |
| CG | Provan | Inc 'A' 4 CIBG | EA | Williams | DMT |
| CG | Racicot | 14 Coy RCEME | WR | Willing | DEME |
| W | Rhodes | ADE | JA | Wilson | DEME |
| RC | Rivers | HQ RCEME Quecom | B | Yarymowich | DEP |
| ANP | Roberts | CALE | | | |

CAPTAINS

| | | | | | |
|---|---|---|---|---|---|
| KI | Anderson | 4 CIBG LAD | RE | Goulding | 3 CIBG LAD |
| LW | Armstrong | 2 Coy RCEME | NA | Graham | 2 CIBG LAD |
| BE | Babcock | 204 Base Wksp | GE | Grainger | ADE |
| GE | Ball | 1 Coy RCEME | DA | Grant | CASC |
| P | Bateson | HQ 1 CIBG | JR | Griffin | RMC of S |
| NE | Birchard | Inc 'A' 4 CIBG | ADL | Grinham | DEME |
| GN | Brent | DEME | WJA | Groom | 19 Coy RCEME |
| JE | Brewster | 18 Coy RCEME | GM | Hagan | Inc 'A' 4 Fd Wksp |
| JE | Brown | General Motors, Oshawa | WJN | Haggins | DDD |
| PL | Burcombe | 202 Base Wksp | DV | Hampson | 1 Fd Wksp |
| FJ | Burton | 202 Base Wksp | PEV | Hansen | 6 Coy RCEME |
| GR | Burton | 7 Coy RCEME | CB | Hellyer | DDD |
| CO | Bush | HQ RCEME Cencom | RV | Hill | 204 Base Wksp |
| LN | Bydal | RCEME School | LF | Holland | ADE |
| JL | Calvert | 8 Coy RCEME | HW | House | 4 Fd Wksp |
| JNR | Campbell | 12 Coy RCEME | AW | Hughes | 11 Coy RCEME |
| AB | Cantlon | RCEME School | RG | Humphreys | 11 Coy RCEME |
| FR | Carruthers | RMC | CA | Hurst | RCEME School |
| FW | Chapman | CASC | MC | Johnston | 2 RCHA LAD |
| HW | Chapman | HQ 4 CIBG | KR | Joslin | 3 RCHA LAD |
| G | Charles | HQ RCEME Wescom | JJ | Kane | 4 Fd Wksp |
| JF | Clarabut | HQ Cencom | JR | Kaye | 1 CIBG LAD |
| JE | Coates | DEME | KT | Kennah | CJATC |
| WG | Collins | RCEME School | JE | Kerr | DEME |
| RDL | Connell | 202 Base Wksp | JJ | Klinec | DEME |
| JH | Cooper | 3 Fd Wksp | NE | Laviolette | RCEME School |
| JN | Courtney | RCEME School | JW | Lelacheur | 56 Cdn Inf Wksp |
| EB | Creber | 1 FGH LAD | AC | Leonard | RMC |
| DH | Cumming | RCEME School | WF | Lucano | 11 Coy RCEME |
| DH | Curling | ADE | AM | MacDonald | 56 Cdn Inf Wksp |
| LA | Daviss | Westinghouse Co Ltd, Hamilton | JA | MacDonald | RMC |
| JD | Delaney | 14 Coy RCEME | AJ | MacGillivray | 8 CH LAD |
| FF | Doherty | DEME | RL | MacIntosh | Redstone Arsenals |
| OA | Edmond | Inc 'B' 4 Fd Wksp | RMG | MacKenzie | 16 Coy RCEME |
| AS | Etter | 56 Cdn Inf Wksp | RH | MacLeod | RMC of S |
| SHJ | Fleming | 202 Base Wksp | E | MacMillan | 3 Coy RCEME |
| RJ | Francis | 1 RCHA LAD | DM | Maher | 3 Coy RCEME |
| DH | Fraser | DEME | JD | McDougall | RMC of S |
| DV | Geary | 1 Fd Wksp | JS | McIntyre | DEME |
| AM | Gilbert | DEME | RA | McKay-Keenan | 4 RCHA LAD |
| FB | Goring | 204 Base Wksp | MD | McKinlay | DEME |

| | | |
|---|---|---|
| FJ | McNaughton | 204 Base Wksp |
| CA | Millar | ADE |
| JF | Moore | DEME |
| CR | Morgan | 4 Coy RCEME |
| DR | Mowbray | CALE |
| JL | Moyse | 204 Base Wksp |
| DA | Nicholson | CADEE |
| PB | Nicholson | ADE |
| PH | North | LdSH LAD |
| WH | Norton | DEME |
| JF | O'Connor | 202 Base Wksp |
| JR | O'Neill | DEME |
| FA | Ouimet | 5 Coy RCEME |
| TW | Oxley | 204 Base Wksp |
| TR | Palfrey | 13 Coy RCEME |
| KS | Parton | 13 Coy RCEME |
| HR | Perry | DEME |
| JR | Peters | 10 Coy RCEME |
| R | Peters | 13 Coy RCEME |
| HA | Popkin | DQOP |
| CH | Putt | DEME |
| JR | Raby | RCEME School |
| JA | Richards | 11 Coy RCEME |
| AT | Roberts | 204 Base Wksp |
| HL | Robinson | RCEME School |
| V | Roddick | 13 Coy RCEME |
| HA | Rosson | 4 Fd Wksp |
| WGL | Russell | 202 Base Wksp |
| LA | Sainsbury | JABC School |
| DA | Saunders | D Pers RCEME |
| GD | Savage | RCD LAD |
| RB | Screaton | 14 Coy RCEME |
| WR | Shaw | UK Staff College |
| JO | Sheehan | DEME |
| WD | Sneddon | RCEME School |
| JA | Stott | 7 Coy RCEME |
| EJ | Stow | Joint Cdn Missile Cold Weather Test |
| WG | Svab | ADE (Fort Churchill) |
| GW | Swallow | DEME |
| WA | Thomas | RCEME School |
| WW | Virtue | 16 Coy RCEME |
| PG | Vyvyan | 3 Coy RCEME |
| HK | Warren | RCEME School |
| BH | Wright | DEME |
| GA | Wright | Office Chief of Ordnance, Washington DC |

LIEUTENANTS

| | | |
|---|---|---|
| AM | Adams | RCEME School |
| WM | Argue | 8 Coy RCEME |
| GF | Bews | ADE |
| JMF | Bourassa | 6 Coy RCEME |
| FN | Brodie | RCEME School |
| LJE | Byer | 2 Fd Wksp |
| DM | Campbell | 16 Coy RCEME |
| WM | Campbell | 4 Fd Wksp |
| TM | Chell | 1 Fd Wksp |
| JP | Cloutier | 5 Coy RCEME |
| PR | Comeau | 7 Coy RCEME |
| EM | Conway | 56 Cdn Inf Wksp |
| PR | Dack | RCEME School |
| JHJ | Delisle | McGill University |
| JGR | Doucet | RCEME School |
| JP | Durocher | 5 Coy RCEME |
| S | Dzuba | 13 Coy RCEME |
| CCG | Edgar | 10 Coy RCEME |
| HT | Edworthy | RCEME School |
| JAF | Gagnon | Ecole Polytechnique |
| GL | Gillespie | RCD LAD |
| PM | Graye | RCEME School |
| RT | Hare | 8 CH LAD |
| JM | Hebert | RCEME School |
| HJ | Hellard | RCEME School |
| FA | Hlohovsky | LdSH LAD |
| O | Howard | RCEME School |
| FG | Hutson | 12 Coy RCEME |
| WR | Hyman | 202 Base Wksp |
| ID | Isbester | 3 Coy RCEME |
| AF | Johannes | RCEME School |
| GW | Keays | 3 Coy RCEME |
| RA | Kyle | 1 Fd Wksp |
| PR | Lavallee | 3 Fd Wksp |
| JWL | Lee | RCEME School |
| EV | MacInnis | 7 Coy RCEME |
| GR | Maguire | DEME |
| RJC | Maillet | 11 Coy RCEME |
| MG | Masuda | 1 Fd Wksp |
| GD | McCulloch | RCEME School |
| DG | McKay | HQ RCEME Eascom |
| HJ | Millen | 13 Coy RCEME |
| RW | Miller | RCEME School |
| TM | Mimee | RCEME School |
| HG | Morgan | 1 FGH LAD |
| REM | Nourse | 14 Coy RCEME |
| STA | O'Farrell | 5 Coy RCEME |
| HA | Patterson | 10 Coy RCEME |
| JE | Peacock | DEME |
| DB | Perrin | 16 Coy RCEME |
| WC | Perry | 2 Fd Wksp |
| PP | Pospisil | 10 Coy RCEME |
| RH | Purton | DCER |
| JA | Remington | RCEME School |
| JHP | Richard | 2 Fd Wksp |
| GS | Rippengale | RCEME School |
| PF | Romyn | 204 Base Wksp |
| AG | Rose | HQ RCEME Wescom |
| DJ | Seabrook | 16 Coy RCEME |
| WJ | Shearing | 4 Fd Wksp |
| DR | Springett | 3 Coy RCEME |
| JT | Thompson | 202 Base Wksp |
| RH | Thorn | RCEME School |
| JLF | Tremblay | Ecole Polytechnique |
| JMR | Turcotte | RCEME School |
| VCY | Valiquette | 4 Coy RCEME |
| DS | Van Dusen | 2 Coy RCEME |
| RL | Walker | 202 Base Wksp |
| AG | Waters | 3 Fd Wksp |
| DE | Wilson | RCEME School |
| B | Wong | RCEME School |
| Z | Yarymowich | RCEME School |

SECOND LIEUTENANTS

| | | |
|---|---|---|
| GT | Lake | Queens University |